



Morphological variation in *Thermophis* Malnate (Serpentes: Colubridae), with an expanded description of *T. zhaoermii*

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Abstract

The colubrid snake genus *Thermophis* is endemic to higher altitudes on the Qinghai-Xizang Plateau of China. It has been little studied and remains poorly understood. Until Guo *et al.*'s (2008) description of *T. zhaoermii*, *Thermophis* had been monotypic, containing only *T. baileyi* (Wall 1907). Here, a detailed comparison of external characters, skull and hemipenial morphology in *T. baileyi* and *T. zhaoermii* is presented. Both species are sexually dimorphic, and clearly distinct from one another in external, skull and hemipenial characters. An expanded characterization of the recently described *zhaoermii* is provided.

Key words: China, morphology, snakes, systematics, *Thermophis*

Introduction

The hot-spring keel-back colubrid snake *Thermophis* is endemic to China, where it is found only at higher altitudes (over 3000 m) of the Qinghai-Xizang Plateau (Fig. 1; Zhao *et al.* 1998; Zhao 2006). The type species of *Thermophis*, *T. baileyi* (Wall, 1907) was originally described as *Tropidonotus* (= *Natrix*) *baileyi* for materials from Xizang (Tibet) Autonomous Region (AR) of China. Based on characters of the vertebrae, hemipenis, teeth, and external morphology, Malnate (1953) removed *baileyi* from *Natrix*, and placed it in the newly erected genus *Thermophis*. *Thermophis baileyi* is considered to be a rare snake (Zhao 1998), and has been designated as Vulnerable under the International Union for the Conservation of Nature and Natural Resources Red List (IUCN 2003), and Critically Endangered under the China Species Red List (Wang & Xie 2004). Since it was described, *T. baileyi* has been reported only from small, isolated populations in Xizang AR, China (Zhao *et al.* 1998; Zhao 2006). The apparent rarity and restricted distribution of *T. baileyi* have contributed to there being only a few studies on this snake in the past two decades (Zhang *et al.* 1984; Hu 1987; Zeng *et al.* 1996; Zhao *et al.* 1998; Guo & Chen 2000). *Thermophis baileyi* is generally encountered around rocks, rivers, and marshes near hot springs (Malnate 1953; Li 2007; Hu 2007), where it feeds mainly on amphibians and fish, including *Nanorana parkeri*, *Schizothorax oconnori*, and *Triplophysa* sp. (Li 2007; Hu 2007).

During a field trip in western Sichuan, China, in August 2004, several individuals referable to *Thermophis* were collected in Litang County, and these specimens were initially identified as *T. baileyi* (Liu & Zhao